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AUTHOR Molek, Carol
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ABSTRACT

This booklet is intended to assist tutors in helping transitional and low-level adult basic education (ABE) students acquire the math skills required to make a successful adjustment to regular ABE classes. The exercises provided are intended primarily for use in student-tutor learning teams, with students gradually completing greater portions of the exercises on their own as they become increasingly self-directed. Major emphasis is given to solving word problems. Materials are provided on approaching word problems, finding key words, key words typically associated with each of the four arithmetic operations, the importance of thinking carefully and logically, techniques for drawing diagrams to solve word problems and breaking them up into smaller parts, and the importance of using common sense when solving math word problems. Guidelines and exercises dealing with solving problems involving whole numbers, fractions (mixed and simple), and decimal fractions are also included. A 115-item bibliography concludes the document. (MN)

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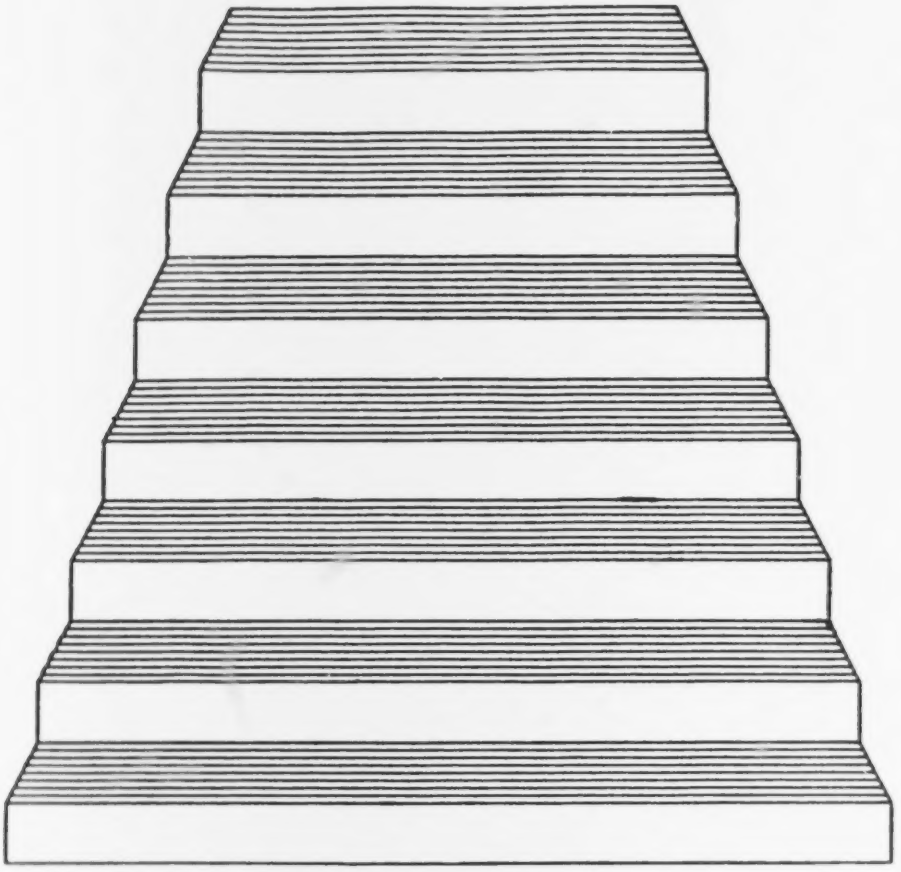

MATH READY

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R. D. 1, BOX 70-A
McVEYTOWN, PA. 17051

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MATH READY

Exercises

"Ready-Set-ABE"
to ease students' transition into
ABE level studies

by
Carol Molek
Supervisor/Instructor

June 27, 1987

Tuscarora Intermediate Unit No. 11
R.D. #1, Box 70-A
McVeytown, PA 17051

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MATH READY

Exercises

"Ready-Set-ABE"

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Math Ready
Exercises

INTRODUCTION

The following booklet contains math exercises we found useful in our Ready-Set-ABE program for transitional literacy/ABE students. Materials utilized were teacher created or adapted from commercially produced exercises (see bibliography).

The exercises were not designed primarily for independent learning but rather for student-tutor learning teams. As students became more self directed some exercises were completed on their own and then reviewed with the tutor.

Many transitional students do not have a working knowledge of math fundamentals. Arithmetic facts are not included in this booklet but are, of course, the first step in preparing the student for ABE math studies. Our tutor-student teams worked effectively with flash cards and basic drill and practice exercises to master math facts.

What is stressed in this exercise booklet is math reading as this is the area we found most troublesome to our students once they could competently manage the mechanics of math functions. By developing reading skills (see additional math reading in "Reading Ready" Exercises) our hope is that math will become as manageable a subject as science or social studies. We met with much success with our transitional math students. Tutor/student teams worked progressively and in most cases these students maintained success within the ABE classroom. Hopefully, Math Ready will help others to ease the transition from literacy to ABE student.

Much appreciation for assistance on this project goes to assistant instructor, Harold Peachey; instructor, Barbara Goss; secretary, Ginger Shade; as well as the rest of the Adult Education T.I.U. Center staff.

C.M.

HOW TO APPROACH WORD PROBLEMS

You can more easily and efficiently solve word problems if you follow a few simple rules. Begin by asking yourself several questions.

WHAT FACTS ARE GIVEN?

WHAT CAN BE DETERMINED FROM THE FACTS PROVIDED?

HOW CAN YOU USE THE FACTS THAT ARE GIVEN TO FIND THE ANSWER TO THE QUESTION ASKED?

IS YOUR ANSWER LOGICAL? PRACTICAL? REALISTIC?
DOES YOUR ANSWER MAKE SENSE?

More Hints for Solving Word Problems

BE READY TO THINK.

TAKE YOUR TIME.

Have the proper equipment: paper, pencil, etc.
Read each problem twice; first for the general idea and for general information, then a second time for details.

Read the problem again when you have finished to make sure you have answered the question asked.

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, Missouri: McDonald Publishing Co., 1980), p. 1.

To help you do word problems:

1. MAKE THE NUMBERS in the problem EASIER. Change the numbers in the problem to 2 and 4. This will help you to decide whether to add, subtract, multiply or divide.

2. DRAW A PICTURE of the problem using small or easier numbers. What's the answer? How did you get the answer? Did you add? Subtract? Multiply? Divide? Do the same thing with the real numbers in the problem.

3. ROUND OFF the numbers AND ESTIMATE an answer.

4. WORK OUT THE PROBLEM.

5. REREAD THE PROBLEM. IS YOUR ANSWER REASONABLE? (Is your answer close to your estimate?)

6. CHECK your computation.

7. LABEL your answer.

EXAMPLE: A grocer had 8 boxes of apples. Each box had 48 apples in it. How many apples in all?

How did you get the answer? You should have multiplied.

To help you do word problems: (continued)

So multiply 48 X 8

Round off the numbers and estimate.

$$\begin{array}{r} 48 \\ \times\ 8 \end{array} \quad \text{is about} \quad \begin{array}{r} 50 \\ \times\ 8 \end{array}$$

Since 50 x 8 is 400, then 48 x 8 must be about 400.

Work the problems:

$$\begin{array}{r} 48 \\ \times\ 8 \\ \hline 384 \end{array}$$

Does 384 apples make sense for your answer?

Check: Division is the check for multiplication.

$$\begin{array}{r} 48 \\ 8\overline{)384} \\ -32 \\ \hline 64 \\ -64 \end{array}$$

Adapted from:
Dick Holmes, Mathematics 5 Problem Solving Activities (Palo Alto, CA: Dale Seymour Publications, 1982.

Finding the Key Words

When reading and working problems, make certain that you can identify the most important words. If you can determine these key words, work with all the facts given, and clearly comprehend what you are being asked; you can solve the problem.

The first step in successfully solving word problems is to read carefully and slowly and to focus on the key words.

Underline the key words in each problem below and then work it to determine the correct answer.

1. By how much does 973 exceed 185?

2. Gasoline has become much more expensive. Last year the number of cars sold in Pontiac County was 57,325. The sale of cars decreased this year by 12,981. How many cars were sold this year?

3. Jake Perkins had a record wheat crop last year with a total of 10,147 bushels harvested. This year the blight bug caused a great deal of damage to his wheat field. He only produced 8,269 bushels. His crop diminished by how many bushels?

4. Find the average of 28, 28, 42, 56, 56, 98 and 7.

5. If Jim's uncle is two and one-half decades older than Jim and Jim is 14; how old is Jim's uncle?

6. Mrs. Gilman bought a sailboat for $1500 and then sold it at a $300 loss. What was the selling price?

7. Mr. Robnett makes a monthly salary of $1250. What is his annual salary?

8. Carolyn sold her ten speed bicycle for $65. She made a profit of $17. How much did she originally pay for the bicycle?

Adapted from:

Stephen E. Switzer, Mastering Word Problems (St. Louis, Missouri: McDonald Publishing Co., 1980), p. 2.

SOME KEY WORDS AND PHRASES FOR ARITHMETIC OPERATIONS

Addition	Subtraction	Multiplication	Division
SUM	*DIFFERENCE*	*PRODUCT*	*QUOTIENT*
TOTAL	*FEWER*	*OF*	*RATIO*
PLUS	*LESS THAN*	*AT*	*GO INTO*
INCREASE	*REDUCE*	*TIMES*	*CONTAINED*
MORE THAN	*DECREASE*		*AVERAGE*
GREATER THAN	*DIMINISH*		
EXCEED	*MINUS*		
AND	*TAKE AWAY*		
MAKE LARGER	*LOWER*		
RAISE			

THINKING CAREFULLY AND LOGICALLY

When working with word problems one must be careful to think critically and thoughtfully. Make sure you are working with all the facts. Do not rush. Check to see if your answer is practical and logical.

Think through each problem below and place the correct answer in the blank space provided.

1. The area of any surface is measured in _____ units.
2. If you know the perimeter of a square then you can determine the length of one side by _____.
3. One third of a number is found by _____.
4. To find the average of five numbers you would _____.
5. To find the difference between two numbers you would _____.
6. If a jet plane flies at a rate of so many miles per hour for six hours, the distance it travels can be found by _____.
7. One would change inches to yards by _____.
8. The number of years from 250 B.C. to 850 A.D. would be _____.
9. If one has three fractions and each has a different denominator, then to add them one must find their _____.

Adapted from:

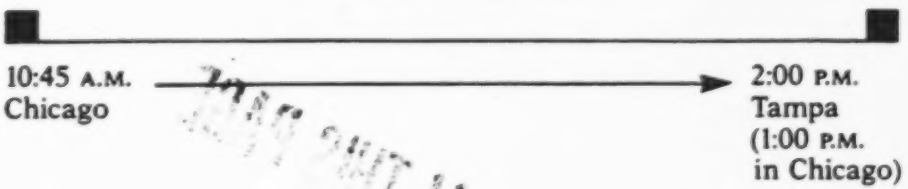
Stephen E. Switzer, Mastering Word Problems (St. Louis, Missouri: McDonald Publishing Co., 1980), p. 11.

DRAWING A DIAGRAM TO SOLVE MATH WORD PROBLEMS

Some problems are easier to solve if you draw a diagram using the information given. Then you can "see" what the problem is about.

Example: A plane leaves Chicago's O'Hare Airport at 10:45 A.M. It arrives at Tampa International Airport at 2:00 P.M. Tampa time. Since Tampa is an hour ahead of Chicago, how long did the flight take?

3 hours 15 minutes



3 hours 15 minutes traveling time + 1 hour = 2 hours 15 minutes

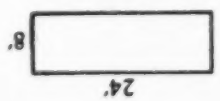
Now you try one:

Mark wants to build a fence around his garden. The length of the garden, 24 feet, is 3 times as long as the width. How many feet of fencing does Mark need? Draw a diagram.

Solve the problem.

Answer

Length = 24 feet
Width = 24 ÷ 3 = 8 feet
Fencing = 24 + 8 + 24 + 8 = 64 feet



Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 45.

BREAKING MATH PROBLEMS INTO SMALLER STEPS

Some problems take several steps to solve. For these problems, the best bet is to break the problem into several manageable steps.

Example: Richardson's Taxicab Company has three shifts with 17 drivers each. Since each driver takes in an average of $300 in fares per day, what is the approximate weekly income of Richardson's (based on a seven-day work week)?

The questions asks me to find How much do Richardson's drivers take in during a week?

Step 1. 3 shifts × 17 drivers = 51 drivers per day
Step 2. 51 drivers × $300 per day = $15,300 per day
Step 3. $15,300 per day × 7 days = $107,100 per week
Answer: $107,100 per week

Now you try one:

Mike's Garage got a special deal on 125 widgets. The widgets, originally listed at $3.95, were on sale for 10% off. Mike received an additional 5% discount for buying more than 100. How much did he pay for all the widgets?

Step 1. _____

Step 2. _____

Step 3. _____

Answer: _____

Answer

Step 1. 125 widgets × $3.95 = $493.75
Step 2. $493.75 × .10 = $49.38
$493.75 − $49.38 = $444.37
Step 3. $444.37 × .05 = $22.22
$444.37 − $22.22 = $422.15
Answer: $422.15

Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 46.

PROBLEMS WITH WHOLE NUMBERS

Find the numbers that you will need to work with in each story problem. Then decide what process you will need to solve the problem. Work carefully. Avoid careless errors.

Work each problem below and find the correct answer.

1. The Calvins went west on their family vacation. They drove 543 miles the first day and 475 miles the second day. If they had driven a total of 1,205 miles by the end of the third day, how many miles did they drive the third day?

2. What is the price of one can of vegetable soup if three cans cost $1.08?

3. Susan, Carolyn and Judy have a garden. During the summer they sold their produce for a total of $336. What was each woman's share?

4. If tennis balls sell 3 for $1.98, how much would a dozen tennis balls cost?

5. If 279 is diminished by the sum of 78 and 54, and the result is multiplied by 3 and then subtracted by 6; what is the answer?

6. Jessica is now five years old and her sister is four times as old. How many times as old will her sister by in five more years?

7. Simplify $10 + 5 \times 3 - 25 \div 5 + 6$.

8. What is the smallest number into which 5, 8, 10 and 12 can be evenly divided?

9. A grocery store owner put out on display six piles of oranges. There are 28 oranges in each pile. How many oranges did he use?

10. A truck was loaded with 57 crates of apples, each crate weighing 96 pounds. How heavy was the load?

11. If a digital watch gains 10 seconds a day, how much will it gain in a week?

12. At a rate of six miles per hour, how long will it take a bicyclist to go 120 miles?

13. How many 50 pound bags make a ton of cement?

Adapted from:

Stephen E. Switzer, Mastering Word Problems (St. Louis, Missouri: McDonald Publishing Co., 1980), p. 3.

THE WHOLE AND ITS PARTS

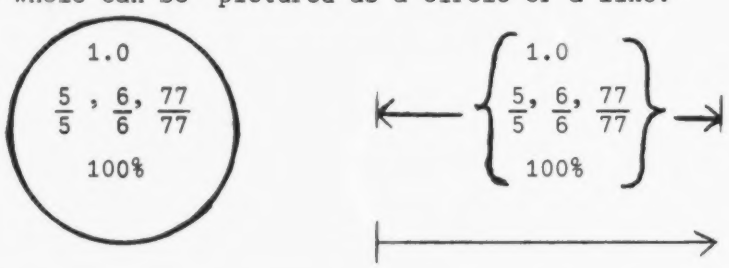
Many people experience difficulty understanding numbers that express parts of the whole. Most adult students approach fractions, decimals and percents in great fear. There has never been a fraction, decimal or percent that had teeth, claws or a deadly weapon.

If these numbers are approached with a can-do attitude in a systematic and logical way the mysteries fade into familiarity and the impossible is overcome.

Fractions, decimals and percents are simple methods of expressing parts of the whole. Each method has its own characteristic rules for performing the operations of addition, subtraction, multiplication and division, but the underlying concept is the same.

So what does "parts of the whole" mean? Two convenient ways to look at parts of the whole are circle pictures and line pictures.

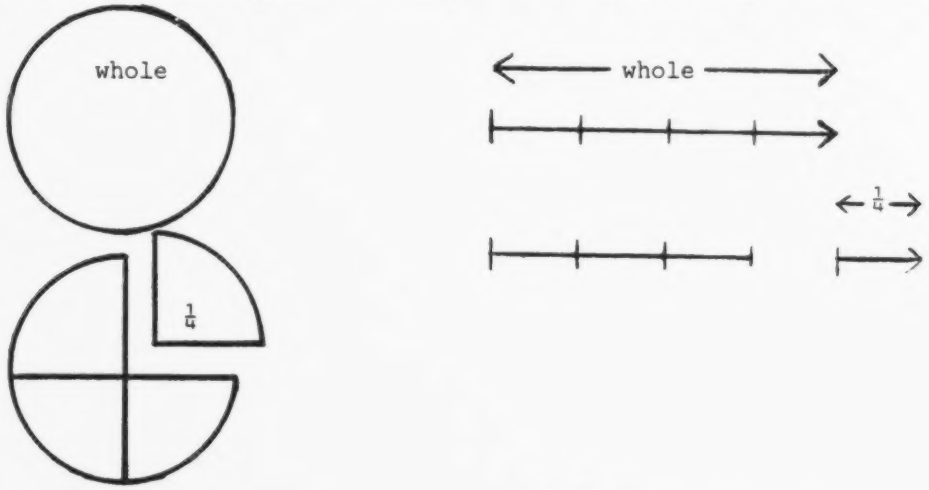
The whole can be pictured as a circle or a line.



These pictures can represent <u>anything</u> including: a pizza, distance, income, price, populations, grades, food.....ANYTHING!!!

When the picture represents the whole it can be described as a fraction equal to one. Any fraction with the same number in the numerator and the denominator is equal to one: $\frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{7{,}576321}{7{,}576321} = 1$.

The fraction tells us how many pieces the whole is cut up into and how many pieces we have. The denominator always tells how many pieces are in the whole. The numerator tells how many of the pieces we have or are concerned with. Thus $\frac{1}{4}$ tells us that the whole is cut into 4 pieces and we have 1 of those pieces. The pictures representing $\frac{1}{4}$ look like this.



There are only three things to be concerned with in parts of the whole problems:

-the whole, (expressed as 1.0, 100% or a fraction whose numerator and denominator are the same number: example $\frac{5}{5}$, $\frac{6}{6}$, $\frac{94}{94}$, etc.),

-the part (the actual amount of the whole we have), and

-the part of the whole (expressed as a fraction, decimal or percent of the whole).

Before working any problem these things must be determined.

Look at the following statements.

There are 42 people in a classroom. $\frac{1}{2}$ of them are women. There are 21 women in the classroom.

The whole is 42 people
The part is 21 woman
The part of the whole is $\frac{1}{2}$

There are 42 people in a classroom. .5 of them are women. There are 21 women in the classroom.

The whole is 42 people
The part is 21 women
The part of the whole is .5

See if you can determine the whole, the part and the part of the whole in the following statements.

$\frac{4}{5}$ of $1.00 is $.80.

whole =
part =
part of whole =

28 people went fishing. $\frac{6}{7}$ of those people caught 73 fish. 24 people caught fish.

whole =
part =
part of whole =

There are 15,000 registered voters in Mudville. In a recent election 7,500 or 50% of the registered voters did not vote.

whole =
part -
part of whole =

All problems with parts of the whole will give enough information for 2 of the three elements described above. Once you are able to recognize these elements, careful reading of the problem will tell which element is needed to answer the problem. There are only 3 possible forms that parts of the whole problems can take.

1. If you are given the <u>part</u> and the <u>whole</u> and the <u>part of the whole</u> is asked for, use this formula.

$$\frac{\text{PART}}{\text{WHOLE}} = \text{part of the whole} \quad \text{or} \quad \text{WHOLE}\overline{)\text{PART}}^{\text{PART OF WHOLE}}$$

2. If the <u>part of the whole</u> and the <u>part</u> are given use this formula.

$$\text{PART OF WHOLE}\overline{)\text{PART}}^{\text{WHOLE}} \quad \text{or} \quad \frac{\text{PART}}{\text{PART OF WHOLE}} = \text{WHOLE}$$

3. If the <u>whole</u> and the <u>part of the whole</u> are given use this formula.

$$\text{WHOLE} \times \text{PART OF WHOLE} = \text{PART}$$

You will learn the mechanics of working with fractions, decimals and percents later, but remember that <u>all</u> parts of the whole problems will fit one of these three forms.

Examples:

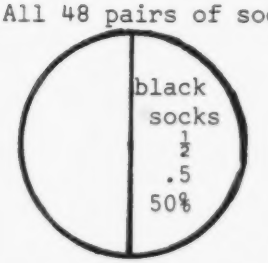
There are 48 pairs of socks in my drawer. 24 of those pairs of socks are black. What <u>part of the whole</u> (fraction, decimal, or percent) group of socks are black.

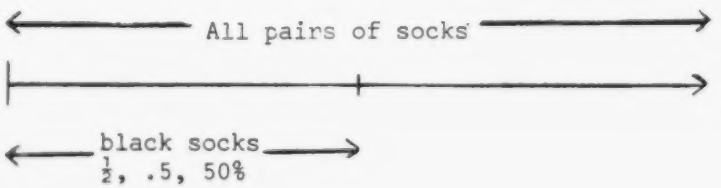
whole - 48
part - 24
part of whole - ?

$$\frac{\text{part}}{\text{whole}} = \text{part of whole}$$

$$\frac{24}{48} = \frac{1}{2} \text{ or } .5 \text{ or } 50\%$$

All 48 pairs of socks





Try a few sample problems. Do not be concerned with solving the problems but try only to put them into the proper form. Practice drawing pictures also.

1. Fred makes $1,000 a month he uses 25% of his pay for his house payment. How much does Fred pay on his house each month.

whole =
part =
part of whole =

2. On a recent GED test, May got $\frac{1}{10}$ of the answers wrong. She had 20 wrong wrong answers all together. How many questions were on the GED test?

whole =
part =
part of whole =

FIGURING OUT FRACTIONS

A fraction has two parts. Example: $\frac{3}{4}$ The top number (3) is the numerator and the bottom number (4) is the denominator. When adding or subtracting fractions, one must have a common denominator.

Example:

$$\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6} = \frac{7}{6} = 1\frac{1}{6}$$

Improper fractions should be changed to a mixed number.

Example:

$\frac{7}{6} = 1\frac{1}{6}$; divide 7 by 6: $6\overline{)\,7}$ (quotient 1, remainder 6, leaving 1) the remainder 1 becomes $\frac{1}{6}$

Work carefully and thoughtfully when changing fractions so that they have a common denominator.

Solve the problems below. Reduce each problem to its simplest or lowest form:

Example: $\frac{3}{6} = \frac{1}{2}$

1. John had $\frac{2}{3}$ pound of chocolate candy. Robert had $\frac{4}{9}$ of a pound of peppermint candy. They were good friends so they decided to split their candy evenly between them. How much candy did each man receive?

2. Ginny decided to bake a chocolate cake. The recipe called for $\frac{1}{4}$ of a cup of sugar. Later she used $\frac{2}{3}$ cup of sugar with the icing. How much sugar did she use for the entire cake?

3. Carlos is the tennis coach at Hillsdale Junior High School. When he started the tennis unit he had $\frac{3}{4}$ of a basket full of tennis balls. When the unit had been completed he found that he had only $\frac{2}{3}$ of a basket left. How many tennis balls were used during the unit?

4. Jessica took a math test. It had 20 questions. She missed only 4 problems. What fraction of the questions on the test did she have correct?

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 6.

To multiply a fraction by another fraction, you must:

1. first, multiply the numerators of the two fractions
2. then, multiply the denominators of the two fractions
3. The answer or **product** you get is another fraction. Reduce the product if you can.

Remember the numerator is the top number in the fraction and the denominator is the bottom number in the fraction.

EXAMPLE: The problem is $\frac{1}{2} \times \frac{1}{2} =$

1. multiply one numerator by the other $1 \times 1 = 1$
2. multiply one denominator by the other $2 \times 2 = 4$

The answer then, is $\frac{1 \times 1}{2 \times 2}$ or $\frac{1}{4}$ This fraction cannot be reduced

EXAMPLES:

$\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$

1. multiply the numerators times each other
2. multiply the denominators times each other

$\frac{2}{7} \times \frac{1}{2} \quad \frac{2}{14}$

1. multiply the numerators _____
2. multiply the denominators _____

Since you know how to reduce fractions, you can see that in the last example that the fraction $\frac{2}{14}$ can be reduced to $\frac{1}{7}$.

DID YOU NOTICE THAT UNLIKE ADDING AND SUBTRACTING FRACTIONS, YOU DO NOT HAVE TO HAVE LIKE DENOMINATORS.

PRACTICE: Multiply the following fractions. Reduce if you can.

$\frac{1}{2} \times \frac{1}{2} =$	$\frac{1}{3} \times \frac{1}{3} =$	A
$\frac{1}{4} \times \frac{1}{3} =$	$\frac{1}{5} \times \frac{1}{2} =$	B
$\frac{3}{4} \times \frac{1}{5} =$	$\frac{4}{5} \times \frac{1}{3} =$	C

Adapted from:
Marcy K. Clubb, Would You Believe I'm Multiplying Fractions? (St. Louis, MO: Kids in Between, Inc., 1985), p. 5.

TAKING A SHORTCUT!

When you multiply fractions, there is a shortcut you can take to help you get the product in its reduced form.

Say for example, you have the problem: $\frac{4}{8} \times \frac{3}{6}$

As you know one way to get the answer is multiply the numerators times each other and then multiply the denominators times each other.

$$\frac{4}{8} \times \frac{3}{6} = \frac{12}{48}$$

You have to reduce this fraction. You have to really think to come up with the right numbers in order to reduce. The larger your answer, or product, the harder it is to reduce.

Well, there's a shortcut that makes multiplying fractions easier. It doesn't always reduce the fraction to its simplest or lowest form, but it will give you fractions that are easier to work with.

For example, which would be easier to reduce? $\frac{6}{24}$ or $\frac{36}{144}$?

Let's hope you said $\frac{6}{24}$. Both $\frac{6}{24}$ and $\frac{36}{144}$ equal $\frac{1}{4}$. Don't you think $\frac{6}{24}$ is easier to reduce than $\frac{36}{144}$?

This shortcut will give you smaller fractions to reduce. If you take the shortcut, you'll end up with the same answer you'd get if you did the multiplication the long, hard way.

Go back to the example: $\frac{4}{8} \times \frac{3}{6} =$

THE SHORTCUT

Step 1. Look at the **numerator** of the **first** fraction. The numerator is 4.

Step 2. Look at the **denominator** of the **second** fraction. The denominator is 6.

$$\frac{4}{\ } \times \frac{\ }{6} =$$

Adapted from:
Marcy K. Clubb, Would You Believe I'm Multiplying Fractions? (St. Louis, MO: Kids In Between, INc., 1985), p. 8.

Step 3. Ask yourself is there any number that will go into **both** the numerator of the first fraction and the denominator of the second fraction.

In the example, ask yourself will 1 go into 4? Will 1 go into 6? The answer is yes, but that won't help you out. 1 will go into every number.

Will 2 go evenly into numerator 4? The answer is yes! Will 2 go evenly into the denominator 6? The answer is, again, yes!

Step 4. Once you have discovered the **highest** number that goes into **both** the numerator of the first fraction and the denominator of the second fraction, you will divide that number into both the numerator and the denominator.

LOOK: $\frac{4}{} \times \frac{}{6} = \frac{4 \div 2}{} \times \frac{}{6 \div 2} = \frac{2}{} \times \frac{}{3}$

Now you don't have to write all this out. You can show the reduction by crossing through the 4 and the 6 and then writing the new numbers. This is called **cross cancelling out the numerators and denominators.**

The problem would then look like: $\frac{^{2}\not{4}}{} \times \frac{}{\not{6}\ 3}$

PRACTICE: DO THE PROBLEMS AS SHOWN IN THE EXAMPLE BELOW. LOOK AT Step 3 ABOVE TO HELP YOU.

$\frac{4}{} \times \frac{}{6}$ numerator 4 & denominator 6 both can be divided by 2.

PROBLEM	NUMERATOR	DENOMINATOR	CAN BE DIVIDED BY	
$\frac{8}{} \times \frac{}{4}$	_____	_____	_____	A
$\frac{3}{} \times \frac{}{12}$	_____	_____	_____	B

Adapted from:
Marcy K. Clubb, Would You Believe I'm Multiplying Fractions? (St. Louis, MO: Kids In Between, Inc., 1985), p. 9.

INVERTING AND CHANGING DIVISION TO MULTIPLICATION

1. Okay, then, the **first step** in dividing fractions is **inverting.** Invert the SECOND FRACTION.

EXAMPLE

STEP 1 $\frac{2}{3} \div \frac{4}{6}$ $\frac{4}{6}$ is inverted and becomes $\frac{6}{4}$.

2. The second step in dividing fractions is to change the division sign to a multiplication sign.

STEP 2 $\frac{2}{3} \div \frac{4}{6} = \frac{2}{3} \times \frac{6}{4}$ The division sign is changed to a multiplication sign.

IT'S ALWAYS BEST TO REDUCE FIRST

You've already been told that when working with fractions it's important to reduce the fraction **before** you begin working the problem. Here's a reminder that shows again how important it is to reduce first.

EXAMPLE $\frac{18}{81} \div \frac{16}{24} = \frac{18}{81} \times \frac{24}{16} = \frac{432}{1296}$

The above fraction, believe it or not, can be reduced to $\frac{1}{3}$.

Here's the shortcut:

$\frac{18}{81} \div \frac{16}{24} = \frac{18}{81} \times \frac{24}{16}$ = 1. $\frac{18}{81}$ can be reduced to $\frac{2}{9}$.

2. $\frac{24}{16}$ can be reduced to $\frac{3}{2}$.

Now the problem looks like $\frac{{}^{1}\cancel{2}}{{}_{3}\cancel{9}} \times \frac{\cancel{3}^{1}}{\cancel{2}_{1}}$ At this point you can cross cancel. The answer is $\frac{1}{3}$.

Adapted from:
Marcy K. Clubb, Bob Rebello, and Barbara Slater, At Last! I Made it to Division of Fractions (St. Louis, MO: Kids In Between, Inc., 1985), pp. 7, 12.

DIVISION OF MIXED FRACTIONS

Here are the steps that you need to go through to divide mixed fractions.

1. **Change both of the mixed fractions to improper fractions.**
2. **Invert the second fraction. Change the division sign to a multiplication sign.**
3. **Reduce or cross cancel.**
4. **Multiply the fractions times each other.**
5. **Reduce your answer if the answer can be reduced.**

PRACTICE: Follow the above steps to work the following problems.

$1\frac{4}{6} \div \frac{5}{6} = \frac{10}{6} \div \frac{5}{6} = \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{6}}} \times \frac{\cancel{5}^{1}}{\cancel{5}_{1}} = \frac{2}{1} = 2$

$2\frac{1}{6} \div 4\frac{1}{2} =$ A

$1\frac{3}{7} \div 2\frac{1}{2} =$ B

$3\frac{1}{2} \div \frac{6}{7} =$ C

$2\frac{4}{7} \div 1\frac{4}{5} =$ D

INVERTING FRACTIONS

One step you will have to do when you divide one fraction by another fraction is called **INVERTING.** Other phrases for inverting is **turning upside down** or the **reciprocal.**

EXAMPLE: $\frac{2}{3}$ turned upside down is $\frac{3}{2}$

OR $\frac{4}{6}$ inverted is $\frac{6}{4}$

Adapted from:
Marcy K. Clubb, Bob Rebello, and Barbara Slater, At Last! I Made it to Division of Fractions (St. Louis, MO: Kids In Between, Inc., 1985), pp. 15, 6.

SOMETHING YOU MAY HAVE FORGOTTEN

There are many laws or rules having to do with mathematics. One such law is the **COMMUNITIVE LAW OF ADDITION.** This means that it does not matter if you reversed the order of the numbers that you added. For example, it doesn't matter whether you add 3 + 4 or 4+ 3. The answer will be the same. This is also true when you multiply. It does not matter whether you multiply 3 x 6 or 6 x 3. The answer will be the same.

Subtraction and division, though, are **ARE NOT COMMUNITIVE.** These same laws also apply to fractions. For example:

$\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$ You will get the same answer if you put: $\frac{2}{3} \times \frac{1}{2}$

Look at the following division of fractions problem:

EXAMPLE $\frac{1}{2} \div \frac{2}{3} = \frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$

Now if the fractions in the problem are reversed, you get an entirely different answer.

EXAMPLE $\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \times \frac{2}{1} = \frac{4}{3} = 1\frac{1}{3}$

Therefore, division problems are not communitive because you do not get the same answer if you reverse the numbers in the problem.

PRACTICE: Work the following problems as they are given. Then reverse the fractions in the problem. Follow the example.

AS GIVEN	REVERSED
$\frac{1}{3} \div \frac{3}{4} = \frac{1}{3} \times \frac{4}{3} = \frac{4}{9}$	$\frac{3}{4} \div \frac{1}{3} = \frac{3}{4} \times \frac{3}{1} = \frac{9}{4} = 2\frac{1}{4}$
$\frac{4}{7} \div \frac{6}{7} =$	A
$\frac{2}{5} \div \frac{1}{6} =$	B

Adapted from:
Marcy K. Clubb, Bob Rebello, and Barbara Slater, At Last! I Made it to Division of Fractions (St. Louis, MO: Kids In Between, Inc., 1985), p. 17.

Challenges with Fractions

When multiplying fractions be sure to change mixed numbers to improper fractions.

Example: $1\frac{1}{4} = \frac{5}{4}$

First multiply the numerators and then multiply the denominators.

Example: $\frac{5}{4} \times \frac{1}{3} = \frac{5}{12}$

When dividing fractions change a mixed number to an improper fraction. Take the divisor and multiply by the reciprocal of the divisor.

Example: $1\frac{1}{2} \div \frac{1}{3} = \frac{3}{2} \times \frac{3}{1} = \frac{9}{2} = 4\frac{1}{2}$

Cancel when possible to make the problem easier to manage.

Example: $\frac{3}{4} \times \frac{1}{3} = \frac{1}{4}$

After you have calculated your answer, always change an improper fraction to a mixed number.

Example: $\frac{7}{5} = 1\frac{2}{5}$

Your answer should always be in the simplest form.

Example: $\frac{4}{6} = \frac{2}{3}$

Work carefully and solve the problems below.

1. How many days are there in $\frac{1}{6}$ of June?
2. If it takes Bill $2\frac{3}{4}$ hours to cut the grass, how many minutes does it take him?
3. Mr. and Mrs. Cummings both work. They spend $\frac{1}{4}$ of their combined salaries for their mortgage payment. If their monthly income is $1,080, how much do they pay annually for their mortgage?
4. Laura spends most of her summer vacation with her Grandmother Smith in the city. She spends 48 days with her. Laura's total vacation is 72 days. What part of her vacation does she spend with her grandmother?

Challenges with Fractions (continued)

5. Jack bought a new bicycle. The original sale price was $720. However, the bike was marked $\frac{1}{4}$ off. How much did he pay for the bike?

6. The Teasdales own a small 100 acre farm. They raised 1,350 bushels of wheat. The average production in the United States was $16\frac{1}{4}$ bushels per acre. How much more or less per acre was the Teasdale's production?

7. A piece of calico material is $24\frac{3}{4}$ yards long. If each student in sewing class needs $\frac{3}{4}$ of a yard of material, how many pieces, each $\frac{3}{4}$ yard long, can be cut from the piece of calico.

8. Bob has a newsstand at the corner of 4th Street and 33rd Avenue. On Thursday he sold 118 newspapers and 42 magazines. If he makes a $3\frac{1}{2}$ ¢ profit on each newspaper and 24¢ profit on each magazine, how much profit did he make?

9. Marilyn bought $\frac{1}{2}$ dozen roses for her mother on Mother's Day. She paid $5.04. At this price, what does one rose cost?

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 7.

Using Common Sense in Problem Solving

The use of fractional numbers is limited in solving every day problems. Does it make sense to speak of $\frac{1}{2}$ an idea, $\frac{2}{3}$ of a person, or $\frac{5}{6}$ of a horse? It so happens that certain things have meaning only when we think of them as whole units but not when we think of fractional parts of them.

Twenty-two people are going to the museum in 5 cars. What is the average number of people who will ride in each car?

Finding the average implies division. The equation is $22 \div 5 = n$, where n represents the number of people per car. Solving the equation shows that $n = 4\frac{2}{5}$. Can $4\frac{2}{5}$ people ride in each car?

In this case, you could say that 4 people will ride in each of 3 cars, and that 5 people will ride in each of 2 cars.

Or you might answer the problem by saying, to the nearest person, 4 people ride in each car.

Solve each of the following problems by giving the remainder in fractional form if it is sensible. Be ready to explain why you stated your answers as you did.

1. Mrs. Jensen needed 20 buns for the picnic. The buns are sold in packages of 8 each. How many packages of buns did she buy?

2. The 6 members of the safety committee presented 15 ideas for improving safety. How many ideas did each member present?

3. Mrs. Thompson used 6 cups of sugar to make 4 cakes. If each cake contained the same amount of sugar, how much sugar was used to make each cake?

4. Kathy needed 16 buttons for the dress she was making. The buttons are sold 6 on a card. How many cards of buttons did she buy?

5. An automobile dealer sold 14 cars during March, 19 during April, 26 during May, and 24 during June. What was the average number of cars sold each month?

6. On a 3-day business trip Dan Black drove the following distances: 317 miles, 262 miles, and 235 miles. What was the average number of miles he drove each day?

Adapted from:
E.T. McSwain et al., Arithmetic 5 (New Jersey: Laidlaw Brothers, 1963), p. 198.

RESTATING A MATH WORD PROBLEM

Sometimes by putting a problem in your own words you can get a better idea of how to solve it.

Example: Of the 757 cars sold in Titusville, 493 of them were made in the U.S. and 179 were made in Japan. How many of the cars sold were made outside the U.S.?

Put the question in your own words. Out of all the cars sold, how many of them were made outside the U.S.?

Restate the problem in your own words. There were 757 cars sold in Titusville, and 493 were made in the U.S. That's all I need to know to solve the problem. I don't need to use the number of cars made in Japan.

Solve the problem. 757 cars − 493 cars = 264 cars

Now you try it with the problem below:

Specialty Mart is having a clearance sale. All of the items are marked an additional 10% off their original sale price. A coat had originally cost $120 and had been on sale at half price. What was the cost of the coat on clearance?

Put the question in your own words. _____

Restate the problem in your own words. _____

Solve the problem. _____

Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 43.

Solve the problem. _____

_____

Answer

The question in your own words might read something like this:

How much does a coat cost that first was on sale and then was on clearance?

Your restatement of the problem might have been similar to this:

I need to find the clearance cost of the coat, which was marked down 10%. Before I can do that, though, I need to find the original sale cost, which is half of $120.

$120 ÷ 2 = $60 sale cost

$60 × .10 = $6 clearance reduction

$60 − $6 = $54 clearance price

Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 44.

Decimals

When adding or subtracting decimals, it is important to keep the columns straight with the decimal points in a straight line including the sum and the difference.

Example:

$$\begin{array}{r} 3.2 \\ +\ 42.03 \\ \hline 45.13 \end{array}$$

This number is read "forty five and thirteen hundredths."

$$\begin{array}{r} 24.15 \\ -\ 22.09 \\ \hline 2.06 \end{array}$$

This number is read "two and six hundredths."

Multiply decimals as you would any other numbers. The number of decimal places in the product is the same as the total number of decimal places in both numbers being multiplied.

Example:

$$\begin{array}{rl} 2.1 & \text{(1 decimal place)} \\ \times\ .11 & \text{(2 decimal places)} \\ \hline .231 & \text{(3 decimal places)} \end{array}$$

Divide decimals the same as you would other numbers when the decimal point is in the dividend. Put the decimal directly above your answer: the quotient.

Example:

$$\begin{array}{r} 2.1 \text{ (quotient)} \\ \text{(divisor) } 2\overline{)\ 2.4} \text{ (dividend)} \end{array}$$

When there is a decimal point in the divisor, move it to the right until you have a whole number. Do the same to the dividend an equal number of places. You may add zeros when necessary.

Example:

$$\begin{array}{r} \text{(quotient)} \\ \text{(divisor) } .240\overline{)\ 4.8} \text{ (dividend)} \end{array} \qquad \begin{array}{r} 20. \\ .240\overline{)\ 4.800} \end{array}$$

Work carefully and solve the problems below.

1. Dianne weighs 105.5 pounds. The normal weight for a woman her age is 98 pounds. How much more does she weigh than the normal weight for her age?

2. In December Lewistown got 3.5 inches of snow; in January 24.8 inches, and in February 28.7 inches. How much snow did Lewistown receive during this three month period?

Decimals (continued)

3. Duane walked 14.7 miles in the Walk-A-Thon. Jerry walked 11.9 miles. How many more miles did Duane walk than Jerry?

4. An airplane traveled 644.50 miles per hour on a trip that lasted 3.5 hours. How far did it go?

5. The average rainfall in Spokane, Washington, last year was 3.72 inches of rain each month. What was the total rainfall for the year?

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 8.

Challenges with Decimals

Solve each problem below. Work carefully. Watch where you place the decimal point in your answer.

1. Green County will build 3.6 miles of road. Mr. Hallock contracted to build $\frac{1}{4}$ of the road. How much will he be paid at the rate of $25,515 per mile?

2. The thermometer read 39.6 degrees at 6:00 a.m. and 95.4 degrees at noon. How many degrees did it rise during the morning?

3. Two cities are 93.7 miles apart. How far would it be from either city to a point exactly half way in between?

4. A typical package of typing paper containing 400 sheets is 3.5 inches thick. How thick is one sheet?

5. Sam Smith bought 25 tons of fertilizer for his soybean fields. He used 1.75 tons per acre. How many acres did he fertilize?

6. Mr. Todd spent $60.50 on gasoline on a short business trip. He traveled 400 miles. How much did he spend on gasoline per mile?

7. Lois rode her horse through the meadowlands at a rate of 32.5 miles per hour. How far can she go in 1.4 hours?

8. On top of Mt. McKinley the wind blew at a rate of 40.363 miles per hour. Down in the timberline it blew at 15.25 miles per hour. How much faster was the wind blowing on top of the mountain?

9. Carolyn worked as a clerk in a grocery store. She made $35.50 per week. She spent half of it on clothes each week and put .5 of what was left away for an emergency. How much did she put away in her emergency fund each week?

10. Donna took a train trip of 461.2 miles in 7.5 hours. How far did they travel per hour?

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 9.

TABLE OF MEASURES

LINEAR MEASURE
12 inches = 1 foot (ft.)
3 feet = 1 yard (yd.)
5½ yards = 1 rod (rd.)
16½ feet = 1 rod
320 rods = 1 mile (mi.)
1760 yards = 1 mile
5280 feet = 1 mile

TIME
60 Seconds (sec.) = 1 minute (min.)
60 min. = 1 hour (hr.)
24 hrs. = 1 day
7 days = 1 week (wk.)
365 days = 1 year (yr.)
366 days = 1 leap year
360 days = 1 business year
12 months (mo.) = 1 yr.
10 yrs. = 1 decade
100 yrs. = 1 century

DRY MEASURE
2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel
1 bushel = 1¼ cubic feet

SQUARE MEASURE
144 sq. in. = 1 sq. ft.
9 sq. ft. = 1 sq. yd.
30¼ sq. yds. = 1 sq. rd.
160 sq. rd. = 1 acre
640 acres = 1 sq. mi.

FORMULAS
Area of a triangle = ½bh
Area of a rectangle = lw
Area of a square = S^2
Perimeter of a rectangle = 2 (lxw)
Volume of a rectangular solid = lwh

METRIC LENGTH
10 millimeters (mm.) = 1 centimeter (cm.)
10 cm. = 1 decimeter (dm.)
10 dm. = 1 meter (m.)
10 m. = 1 dekameter (dkm.)
10 dkm. = 1 hectometer (hm.)
10 hm. = 1 kilometer (km.)

WEIGHT
16 ounces (oz.) = 1 pound (lb.)
2000 lbs. = 1 ton

LIQUID MEASURE
16 fluid ounces (fl. oz.) = 1 pint (pt.)
4 gills = 1 pint
2 cups (c.) = 1 pt.
2 pt. = 1 quart (qt.)
4 qt. = 1 gallon (gal.)

COUNTING
12 units = 1 dozen
12 dozen = 1 gross
20 units = 1 score

CUBIC MEASURE
1728 cubic in. = 1 cubic ft.
27 cu. ft. = 1 cu. yd.

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 4.

MIXED PRACTICE

Read each problem carefully and then solve it.

1. Find the difference between 8,973 and 7,984.

2. How many hundreds are there in twenty thousand?

3. If Mr. Vaughn makes $5.50 per hour and works 40 hours each week, how much does he make in a four week month?

4. Manny filled up his gas tank when he bought 30 gallons of gasoline at $1.25 per gallon. How much did it cost him to fill his tank?

5. Add 3 yards and 9 inches to 2 feet and 7 inches.

6. Change $\frac{7}{8}$ so that it will have a denominator of 64.

7. Change $\frac{37}{5}$ to a mixed number.

8. How many $\frac{1}{32}$ inches are there in 6 inches?

9. To find what one number is of another number you _____.

10. What is the average of 15, 17, 23, 51, 27 and 18?

11. There are 27 correct solutions to a puzzle. If $\frac{1}{3}$ of the possible solutions to the puzzle are correct solutions, how many possible solutions exist for the puzzle?

12. The length of a playing field is 100 feet, the width is 45 feet. What is the square footage?

13. What is the perimeter of a rectangular vacant lot where one side is 50 yards and a second side is 24 yards?

14. If there are 4 gills in a pint, how many gills would there be in 2 gallons?

15. A triangle has a base of 8 inches, a side of 6 inches and a height of 7 inches. What is the area of the triangle?

16. A school contracts a bus for a field trip for 30 students. The bus costs $65.00. What would be the cost per student?

17. Express $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{11}{13}$ as decimals and percents.

MORE MIXED PRACTICE (continued)

18. Write $\frac{36}{99}$ in its lowest terms or simplest form.

19. Using only four digits of the following numbers 6, 7, 9, 3, 1, 5, and 4, write the largest number and the smallest number possible.

20. How many seconds are there in 5 hours?

Adapted from:
Stephen E. Switzer, Mastering Word Problems (St. Louis, MO: McDonald Publishing Co., 1980), p. 17, 18.

WRITING MATH WORD PROBLEMS

Have you ever noticed how math authors write word problems? Now it's your turn. Look at the facts below and see how three problems have been written based on them.

Facts: Maria bought 10 gallons of gas at $1.13 per gallon for a total of $11.30. She gets 15 miles per gallon and was able to drive 150 miles on the gas she bought.

Now that you have all the information, you can write problems for others to solve.

Examples:

1. Maria bought 10 gallons of gas and paid $11.30 for it. How much did one gallon of gas cost?
   This is a division problem.
   $11.30 ÷ 10 gallons = $1.13 per gallon
2. Maria gets 15 miles per gallon in her car. How many miles does she travel on 10 gallons of gas?
   This is a multiplication problem.
   15 miles per gallon × 10 gallons = 150 miles
3. Maria drives 150 miles on $11.30. If she gets 15 miles per gallon, how much does one gallon of gas cost?
   This is a two-step problem.
   150 miles ÷ 15 miles per gallon = 10 gallons on the trip
   $11.30 ÷ 10 gallons = $1.13 per gallon

Now you try it.

Facts: Craig bought several items on sale. First, he bought a $20 shirt on sale. At 25% off, he paid $15 for the shirt. Then he bought a tie for $12.50 and two pairs of socks at $5.00 per pair. The total he paid was $37.50.

1. Write a problem to find the cost of the socks.

Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 47.

2. Write a problem to find the sale cost of the shirt.

3. Write a problem to find the cost of the tie if you know the price of the socks, the price of the shirt, and the total amount Craig paid.

Answers

Your word problems may sound similar to this:

1. Craig bought two pairs of socks at $5.00 per pair. What was the total he paid for the socks?
   Multiplication: $5.00 × 2 = $10.00
2. Craig bought a shirt that was originally priced at $20 but was marked down 25%. What was the shirt's sale price?
   Multiplication and subtraction:
   $20 × .25 = $5 $20 − $5 = $15
3. On a recent shopping trip, Craig spent a total of $37.50. If he bought a shirt for $15 and two pairs of socks for $10 total, how much did the only other item he bought—a tie—cost?
   Addition and subtraction:
   $15 + $10 = $25 $37.50 − $25 = $12.50

Patricia Reid, The New GED Tests Overview Viewer's Guide (Chicago, Illinois: Contemporary Books, Inc.), 1987, p. 48.

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Reading comprehension skill builder; excellent information; good stories and practical exercises.

Falstein, Mark. Basic Map Skills. East Lansing, Michigan: Educational Insights, 1981.
Basic concepts are good; material can be adapted for adults.

Fleming, Lillian J., et al., eds. Building Basic Skills in Mathematics. Chicago, Illinois: Contemporary Books, Inc., 1984.
Excellent transitional material; good concepts; good for building concrete basics in math.

Fleming, Lillian, J., et al., eds. Building Basic Skills in Reading, Book 1, 2. Chicago, Illinois: Contemporary Books, Inc., 1982.
Material effective for strengthening necessary reading skills.

Fleming, Lillian J., et al., eds. Building Basic Skills in Social Studies and Building Basic Skills in Science. Chicago, Illinois: Contemporary Books, Inc., 1982.
Excellent for learning important basic concepts; science is especially good.

Fleming, Lillian J., et al., eds. Building Basic Skills in Writing Book 1, 2. Chicago, Illinois: Contemporary Books, Inc., 1984.
Over simplified but useful for a brief review of basics.

Follett Coping Skills. (series). New York: Cambridge Book Company, 1981.
Some good information; easily adaptable for specific needs.

Follett Success Skills. (series). Chicago, Illinois: Follett Publishing Co., 1982.
Excellent, usable activities especially in Holding a Job and The Language You Speak.

Gawronski, Jane Donnelly. Mastering Computational Skills: A Self-Help Workbook. Glenview, Illinois: Scott, Foresman and Company, 1984.
Good resource books for setting up a sequential math outline and for selecting the appropriate exercises to compliment that outline.

Goldman, Carol. "Current Events." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1986.
Many activities focus on media; wide range thoroughly covering everything from TV to newspaper.

Gottlieb, Joan S. Life-Coping Skills. (series). Austin, Texas: Steck-Vaughn Company, 1983.
Excellent for developing survival skills.

Green, Judith Andrews, et al. Strategies for Success. Reading, Social Studies, Mathematics, Science. Austin, Texas: Steck-Vaughn Company, 1987.
Excellent series; terrific information along with a wide variety of exercises; comprehensive skills.

Harder, Dale. Word Problems 6. Castro Valley, CA: The Wizard, 1981.
Good word problems, need to be adapted; too juvenile in appearance and content.

Henney, R. Lee. Basic Education: Reading. New York: Cambridge Book Company, 1977.
Strong on phonetics and vocabulary; some usable ideas and activities.

Hill, Randal C. Superstars of Movies and TV, Sports, Country, Music Hall of Fame, Soul, Rock. Austin, Texas: Steck-Vaughn Company, 1986.
Good stories; should be selected and used according to students' interest levels.

Holmes, Dick. Mathematics 5 Problem Solving Activities. Palo Alto, CA: Dale Seymour Publications, 1981.
Good word problems; very practical, useful exercises.

Howett, Jerry. Basic Skills with Fractions: A Step-by-Step Approach. New York: Cambridge Book Company, 1980.
Mix of practice problems and word problems, very practical and useful exercises; good for building competency with fractions.

Howett, Jerry. Number Power. Chicago, Illinois: Contemporary Books, Inc., 1982.
Excellent material; practice with the basics plus follow-up exercises solving real-life math problems.

Insights: Reading as Thinking. Watertown, MA: Master Education Corporation, 1987.
Good critical thinking skills, especially making inferences.

Jochen, Albert E. and Benjamin Shapiro. Vocational English - 1 (Revised Edition). New York: Globe Book Company, Inc., 1968.
Adaptable exercises; see "Language Ready."

Johnson, Laura S., ed. Reading and the Adult Learner. Newark, Delaware: International Reading Association, 1980.
Resource information; covers a wide variety of situations in which different social groups may need reading skill development.

Jones, Betty, et al. Language Exercises Revised. (series). Austin, Texas: Steck-Vaughn Company, 1984.
Gray and Red Books - excellent for review of basic English; Pink, Violet, and Orange Books - not applicable.

Kaufmann, Jo. Mastering Grammar, Book 1, 2. New York: Cambridge Book Company, 1985.
Excellent material for the transitional student when reaching ABE level; too complicated for the beginning transitional student.

Kerewsky-Halpern, Barbara. Anthropology-The Story of People. New York: Cambridge Book Company, 1983.
Content OK, but the large print format makes material seem too juvenile for adults.

Kesselman-Turken, Judi and Franklynn Peterson. Spelling Simplified. Chicago, Illinois: Contemporary Books, Inc., 1983.
Good phonetics.

Kesselman-Turken, Judi and Franklynn Peterson. The Vocabulary Builder. Chicago, Illinois: Contemporary Books., Inc., 1982.
Nice variety of exercises for the transitional student.

Kozol, Jonathan. Illiterate America. New York: Anchor Press/Doubleday & Company, Inc., 1985.
Comprehensive presentation of causes of illiteracy and what must be done to correct the problem.

Kreitlow, Burton W. Steps to Learning Book 1, 2. Austin, Texas: Steck-Vaughn Company, 1979.
Perfect for literacy but not for transition.

LaPenta, Marilyn. "Teacher Time Savers." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1983.
Very usable material; some information needs to be adapted to an adult level.

Littell, Joseph F., ed. Basic Skills in English (Book 3). Evanston, Illinois: McDougal, Littell & Company, 1980.
Adaptable exercises; see "Language Ready."

Loban, Walter, et al. Grammar and Writing. New York: Macmillan Publishing Co., Inc., 1981.
Adaptable exercises; see "Language Ready."

Malone, Violet M., ed. Coping (Adult Reading: Comprehension). (Books A-F). Glenview, Illinois: Scott, Foresman and Company, 1982.
Books D, E, F most usable. Material is good and is not presented in a juvenile manner.

Malone, Violet M., ed. Messages (Adult Reading: Comprehension). (Books A-F). Glenview, Illinois: Scott, Foresman and Company, 1982.
Some good information that unfortunately gets lost in the large print format and juvenile appearance.

Maney, Ethel S. and Anne F. Kroehler. New Reading-Thinking Skills. Elizabethtown, PA: Continental Press, Inc., 1962.
Good material for understanding multiple meanings and determining analogous relationships. Large print format.

Maney, Ethel S. Reading-Thinking Skills. Elizabethtown, PA: Continental Press, Inc., 1962.
Excellent variety of exercises and activities, good for analogies, word meanings, and main ideas.

Marston, Elsa. Art in your Hometown. New York: Cambridge Book Company, 1983.
Large print format; juvenile appearance.

McSwain, E.T., et al. Arithmetic 5. New Jersey: Laidlaw Brothers, 1963.
Very excellent material for introducing the basics of geometry; excellent information on all types of graphs and map reading, some material needs to be adapted.

Meltzer, Marilyn. Insurance and Taxes Know-How. New York: Cambridge Book Company, 1987.
Good for learning the basics of insurance and taxes; good vocabulary included.

Meltzer, Marilyn. Living Expenses Know-How. New York: Cambridge Book Company, 1987.
Good for learning the basics of finding housing and being a better shopper; more appropriate for the literacy student.

Merriam, Sharon B. Being Responsive to Adult Learners. Washington, D.C.: Scott, Foresman/AAACE, 1986.
Guidelines for understanding and meeting the needs of the adult learner.

Mitchell, Robert. Number Power: Algebra. Chicago, Illinois: Contemporary Books, Inc., 1983.
Excellent material; provides the fundamentals in algebra without the complication and confusion. Good for the beginning algebra student.

Mitchell, Robert and Donald Prickel. Number Power, Book 4, 5. Chicago, Illinois: Contemporary Books, Inc., 1983.
Excellent material, especially Book 5 (Graphs, Tables, Schedules, and Maps); Geometry fundamentals are presented simply, and the graphs, etc. introduce the student to reading and interpreting this material; great for the transitional student.

Murphy, Corea. Challenger. Syracuse, New York: New Readers Press, 1986.
Lots of vocabulary development and phonics.

Niles, Oliver Stanford, et al. Skills for Reading A, B, D. Glenview, Illinois: Scott, Foresman and Company, 1984.
Very usable material; good concepts and exercises.

Otfinski, Steve. "Reading and Reporting." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1986.
Covers everything from learning to use the library to reading and writing reports. Activities and information perfect for the transitional student.

Otfinski, Steve. "Social Studies." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1985.
Material is highly usable, but large print format and elementary type pictures will require adaptations to appeal to the adult student.

Packard, Mary. "Vocabulary." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1986.
Good vocabulary basics.

Panchyshyn, Robert, Ph.D. and Eula Ewing Monroe, Ed.D. Developing Key Concepts for Solving Word Problems-Book D. New York: Barnell Loft, Ltd., 1986.
Good concepts; good word problems.

Pollock, Thomas Clark, et al. The Macmillan English Series 10. New York: The Macmillan Company, 1961.
Adaptable exercises; see "Language Ready."

Putnam, Mildred. Working With Words (revised) and Working With Word Patterns (revised). Austin, Texas: Steck-Vaughn Company, 1975.
Good for review of basics; more for literacy level.

Rakes, Thomas A., Annie DeCaprio, and J. Ralph Randolph. Living in America. (series). Austin, Texas: Steck-Vaughn Company, 1985.
Excellent series; good basics of history and law, great exercises.

Reid, Patricia, ed. The New GED Tests Overview Viewer's Guide. Chicago, Illinois: Contemporary Books, Inc., 1987.
Adaptable exercises; see "Math Ready."

Root, Jane H. Read On! Basic Reading for Adults and Teens Book 4, 5. Syracuse, New York: Literacy Volunteers of America, 1978.
For literacy, designed to teach reading competence.

Rubin, Betsy. Edge on English: All Spelled Out A, B, C, D. Chicago, Illinois: Contemporary Books, Inc., 1986.
Books A and B - too simplified; Book C - excellent for plurals and prefixes; Book D - excellent for consonants, roots, and suffixes.

Ryan, John J., Ed.D. Developing Key Concepts in Math - E (Level 5) and Developing Key Concepts in Math - F (Level 6). New York: Barnell Loft, Ltd., 1985.
Good concepts.

Schaefer, Jack. Shane. New York: Bantam Books, 1949.
Adaptable exercises; see "Language Ready."

Shehan, Lawrence Philip. English and You. New York: Holt, Rinehart and Winston, Inc., 1962.
Adaptable exercises; see "Language Ready."

Schenk, Brian, ed. Living in the Reader's World. New York: Cambridge Book Company, 1983.
Good survival skills. Too basic for transition.

Schenk, Brian. Mastering Reading Comprehension One and Two. New York: Cambridge Book Company, 1985.
Very excellent, comprehensive exercises; covers all aspects of reading from context clues to comprehension skills. Some exercises, however, may be too difficult for the beginning transitional student.

Schenk, Brian, ed. Snapshots: A Collection of Readings for Adults. New York: Cambridge Book Company, 1984.
Good material; not too complicated or complex; nice variety of questions and activities.

Schwartz, Roberta. "Self-Awareness." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., 1986.
Good activities for evaluating every day life skills.

Seiger, Barbara. Mastering Spelling. New York: Cambridge Book Company, 1985.
Good basics; sections on spelling rules, homonyms, and spelling lists are especially good.

Shattuck, Barbara Nemmers. Get Back to Phonics. Step by Step Publications, 1985.
Directed toward learning phonetic skills to improve spelling and reading; good for literacy.

Shea, James T. Working with Numbers. (series). Austin, Texas: Steck-Vaughn Company, 1980.
Good combination of practice problems and word problems; material presented in an adult manner with concepts that are easy to understand.

Speiser, E. Mildred. Math Skills by Objectives. New York: Cambridge Book Company, 1985.
Real usable material; set-up of the material is absolutely excellent; moves the student from one level to the next when the student is ready; practical exercises.

Steps to Mathematics: Book 1 and Book 2. Steck-Vaughn Editorial Staff. Austin, Texas: Steck-Vaughn Company, 1980.
Suitable for beginning literacy student.

Swinburne, Laurence, John F. Warner and Margaret B. Warner. Mastering Basic Reading Skills. (action series). Austin, Texas: Steck-Vaughn Company, 1985.
Good stories and activities; selections should be used in accordance with the students' interests.

Swinburne, Laurence and John F. Warner. Reading Skills for Adults. Austin, Texas: Steck-Vaughn Company, 19--.
Interesting stories; excellent practical application skills.

Switzer, Stephen E. Mastering Word Problems. St. Louis, MO: McDonald Publishing Co., 1980.
Excellent word problems, especially dealing with fractions, decimals, and percents: ready to use; format geared perfectly for adults.

Sylvester, Diane. "Reading." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1986.
Variety of reading activities that includes all the fundamentals; practical exercises.

Tamarkin, Kenneth. Number Power: Book 6 - Word Problems. Chicago, Illinois: Contemporary Books, Inc., 1983.
Excellent material; written and organized to help the student understand, interpret, and solve word problems. Material is graduated, moving slowly from simple to more complicated problems.

Tempel, A. and Barbara Slater. Grasping Graphs. St. Louis, Missouri: Kids In Between, Inc., 1985.
Adaptable exercises; see "Math Ready."

The 1988 Tests of General Educational Development: A Preview. The GED Testing Service: American Council on Education, 1985.
Preview of the content, format, and scoring of the 1988 GED test.

Thomas, Richard C. Hayes Activities for Vocabulary Building. Wilkinsburg, PA: Hayes School Publishing Co., 1971.
Information valuable for basic vocabulary; large print format.

Tivenan, Bonnie. New Beginnings in Reading. Chicago, Illinois: Contemporary Books, Inc., 1985.
Useful series for literacy.

Townsend, Donna, Linda Ward Beech, and Tara McCarthy. Steck-Vaughn Comprehension Skills: Main Ideas 1, 2; Content 1,2; Conclusion 1, 2; Facts 1, 2; Sequence 1, 2. Austin, Texas: Steck-Vaughn Company, 1987.
Excellent material, good for teaching one concept at a time.

Truitt, Ann. Read Better. Austin, Texas: Steck-Vaughn Company, 1975.
Large print format; content and appearance. Not appropriate for transitional adults.

Tussing, Ann K.U. Breakthrough to Math: Level One. (series). Syracuse, New York: New Readers Press, 1981.
For the student who must begin with the very basics, this series would serve an important purpose. It is, however, a bit juvenile in appearance.

Tussing, Ann K.U. Breakthrough to Math: Level 2. (series). Syracuse, New York: New Readers Press, 1982.
Basics of fractions and percents presented in understandable concepts. Plenty of practice exercises included. Extremely usable material. Some material rather juvenile in appearance.

Tyler, Vicki. Mastering Vocabulary. New York: Cambridge Book Company, 1985.
Good vocabulary exercises; a little too complex, however, for the beginning transitional student.

Warriner, John E. and Francis Griffith. English Grammar and Composition (Fourth Course). New York: Harcourt Brace Jovanovich, Inc., 1977.
Adaptable exercises; see "Language Ready."

Warriner, John E., William Renison, and Francis Griffith. English Grammar and Composition 10. New York: Harcourt, Brace, and World, Inc., 1965.
Adaptable exercises; see "Language Ready."

Warriner, John E., Mary E. Whitten, and Francis Griffith. English Grammar and Composition 9. New York: Harcourt Brace Jovanovich, Inc., 1969.
Adaptable exercises; see "Language Ready."

Wiemann, Mary. "Grammar and Spelling." Macmillan Instant Activities Program. New York: Macmillan Publishing Co., Inc., 1981.
Basics of spelling and grammar presented in an easily understandable manner. Format not adult appropriate.